



**Endangered  
Planet**

**Brainworks**  
A KANGAROO KIDS INITIATIVE



# THE CLIMATE CRISIS

The effects of global warming



**Endangered  
Planet**

# THE CLIMATE CRISIS

**JOHN PERRITANO and  
STEPHEN OSBORNE**





Copyright © Leopard Learning 2009  
www.leopardlearning.com

Created by Q2AMedia (www.q2amedia.com)

**Editor** Jessica Cohn

**Art Director** Sumit Charles and Rahul Dhiman

**Senior Designers** Joita Das and Harleen Mehta

**Art Editor** Sujatha Menon

All rights reserved. No part of this publication may be reproduced, or stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission of Leopard Learning, nor be otherwise circulated in any form of binding or cover other than that in which it is published and without a similar condition being imposed on the subsequent purchaser.

Published in India by Popular Prakashan Pvt. Ltd.; 301, Mahalaxmi Chambers, 22, Bhulabhai Desai Road, Mumbai – 400026, India for Brainworks Learning Systems Pvt. Ltd.  
All rights reserved.

10 9 8 7 6 5 4 3 2 1

ISBN: 978-81-7991-491-5

Printed in India by Saurabh Printers Pvt. Ltd., B-280, Okhla Indl. Area, Phase-I, New Delhi-110020.



STAR  © STAR India Pvt. Ltd. The Starkids Logo and the Starkids creative Learning Logo are properties of STAR India Pvt. Ltd.

#### Picture Credits

Cover Images :  
Kwest : Shutterstock

Title Image :  
Christian Darkin : SPL : Photolibrary

Contents Images :  
Lawrence Sawyer : iStockphoto  
Diana Haecker : Associated Press  
Penny Tweedie : Alamy  
Jan Will : iStockPhoto

4-5 Ingo Arndt : Nature Picture Library. 4b  
Sang Tan : Associated Press. 5t Bedu Saini,  
Serambi Indonesia : Associated Press. 6-7  
George Osodi : Associated Press. 7t Marco A.

Rezende : BrazilPhotos : Alamy. 8-9 Illustration  
8b M Stock : Alamy. 9t NASA. 10-11 Jeremy  
Edwards : iStockphoto. 12-13 Alexey Samarin :  
Shutterstock 13t Brasil2 : iStockphoto. 14-15  
Nasa. 14b Misha Japaridze : Associated Press.  
15t David Hay Jones : SPL : Photolibrary.  
16-17 Christian Darkin : SPL : Photolibrary.  
18-19 Lukáš Hejtmán : Shutterstock. 18c  
Science Photo Library 19t Yuriko Nakao :  
Reuters. 20-21 Dainis Derics : Shutterstock.  
20b Michel Lipchitz : Associated Press. 21t  
Jocelyn Augustino : Fema. 22-23 Michael Rieger  
: Fema. 23b Associated Press. 24-25 Lawrence  
Sawyer : iStockphoto. 24t Nasa. 25b Nasa.  
26-27 Franck Prevel : Associated Press. 27t  
Kati Neudert : iStockPhoto. 28-29 Jan Will :  
iStockPhoto. 29 Nasa. 29b Juniors Bildarchiv

: Alamy. 30-31 Amygdala : iStockPhoto. 31t  
Penny Tweedie : Alamy. 32-33 Diana Haecker :  
Associated Press. 32c Ashley Cooper : Alamy.  
33t Weiss and Overpeck : The University  
Of Arizona. 33c Weiss and Overpeck : The  
University Of Arizona. 34-35 Johan Swanepoel :  
Shutterstock. 34b Misha Japaridze : Associated  
Press. 35t Jeanclaude Ernst : Associated Press.  
36-37 Salamanderman : Shutterstock. 37br  
Arthur Kwiatkowski : iStockphoto. 37bc Julián  
Rovagnati : Shutterstock. 37bl Alexander  
Kalina : Shutterstock. 38-39 Martijn Wisse :  
Shutterstock. 39t Ford Motor Company. 40-41  
Chris Rodenberg Photography : Shutterstock.  
42-43 Dainis Derics : Shutterstock. 44-45  
Natalia Bratslavsky : iStockphoto. 46 Ingo  
Arndt : Nature Picture Library.



# Contents

---

<b>The Heat Is On!</b>	4
<b>Understanding Global Warming</b>	8
<b>Taking Earth's Temperature</b>	14
<b>Extreme Weather</b>	20
<b>What Will Happen?</b>	28
<b>What Can We Do?</b>	34
<b>You Can Help</b>	40
<b>Facts At A Glance</b>	42
<b>The Young Activist</b>	44
<b>Glossary and Index</b>	46





# The Heat Is On!

Earth is currently being reshaped by global warming. A century from now, this vision could become real: The Statue of Liberty stands in water up to her knees. New York City is a watery wasteland. Only boats can navigate the streets, which were once full of people. Cruise ships, which cannot get through the pack ice of the Arctic today, speed across the cold waters of the North Pole. The mammoth frozen glaciers that grace Africa's highest mountain—Kilimanjaro—have melted.

**Global warming** is an overall rise in Earth's surface temperature, which has registered all over the globe. Many scientists believe that global warming could drastically change Earth's landscape in your lifetime.



Cars were stranded after torrential rain caused flash flooding in South London in July 2007. Severe weather hit southern and central England and Wales.

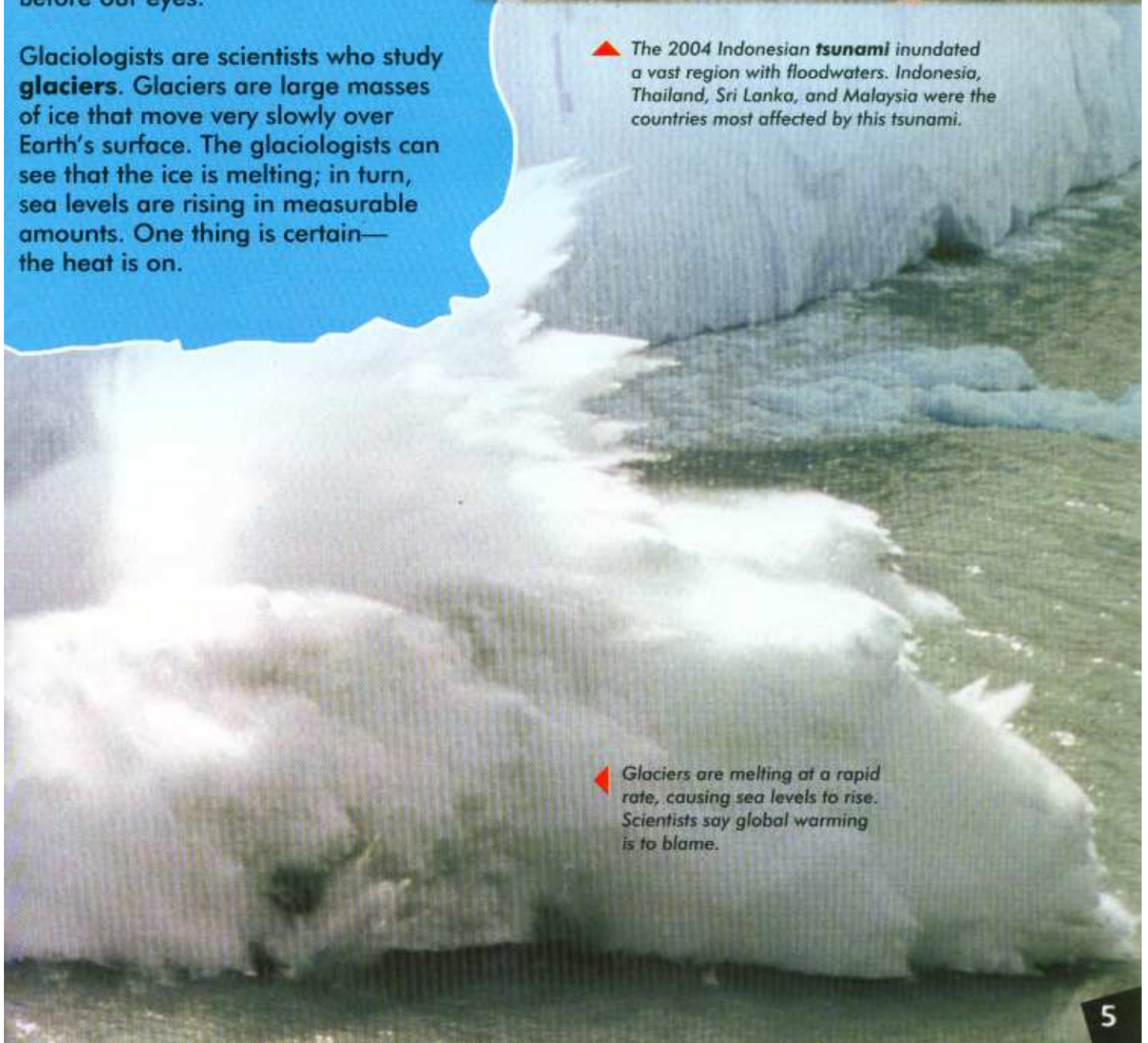


What will your neighborhood be like in 20 years? 50 years? 100 years? You don't have to imagine the future to see what global warming is doing to the planet. Scientists point to changing weather patterns as signs that our fragile atmosphere is getting thinner. Some species of plants and animals that once thrived in parts of our planet are vanishing before our eyes.

Glaciologists are scientists who study **glaciers**. Glaciers are large masses of ice that move very slowly over Earth's surface. The glaciologists can see that the ice is melting; in turn, sea levels are rising in measurable amounts. One thing is certain—the heat is on.



▲ The 2004 Indonesian **tsunami** inundated a vast region with floodwaters. Indonesia, Thailand, Sri Lanka, and Malaysia were the countries most affected by this tsunami.



▲ Glaciers are melting at a rapid rate, causing sea levels to rise. Scientists say global warming is to blame.



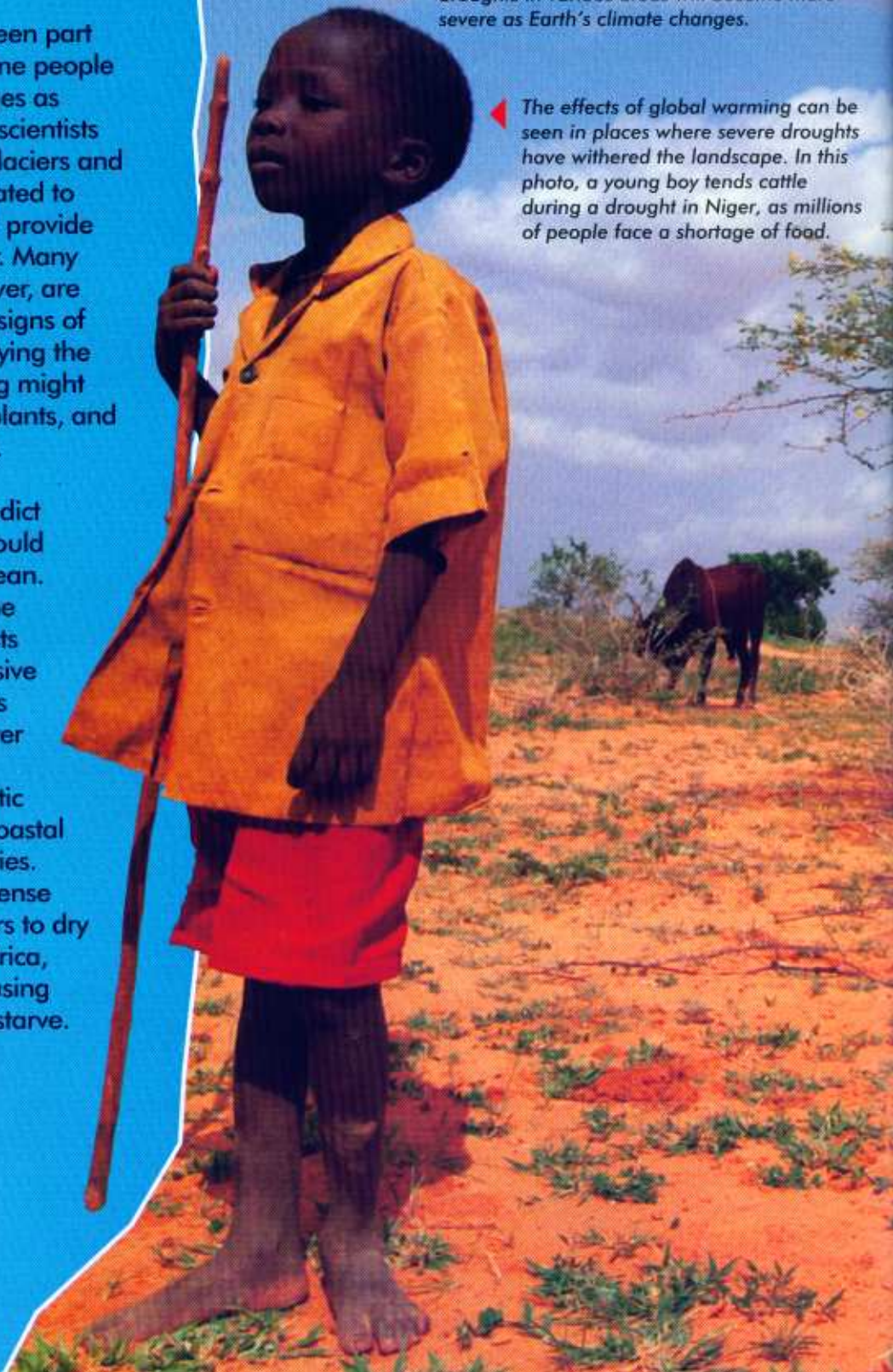
## How will global warming change our planet?

Change has always been part of life on Earth; so some people see our climate changes as natural events. Some scientists believe that melting glaciers and other phenomena related to global warming could provide changes for the better. Many other scientists, however, are actively searching for signs of danger. They are studying the effects global warming might have on the people, plants, and animals of our planet.

Some researchers predict that most of Florida could disappear into the ocean. Chicago could become tropical. Meteorologists hypothesize that massive **hurricanes**—the likes of which we have never seen before—might chug across the Atlantic Ocean, devastating coastal and inland communities. Some suspect that intense heat could cause rivers to dry up in sub-Saharan Africa, ruining crops and causing millions of people to starve.

A child in northeastern Brazil stands beside the dried remains of a cow that died because of a drought. Some scientists predict that droughts in various areas will become more severe as Earth's climate changes.

The effects of global warming can be seen in places where severe droughts have withered the landscape. In this photo, a young boy tends cattle during a drought in Niger, as millions of people face a shortage of food.

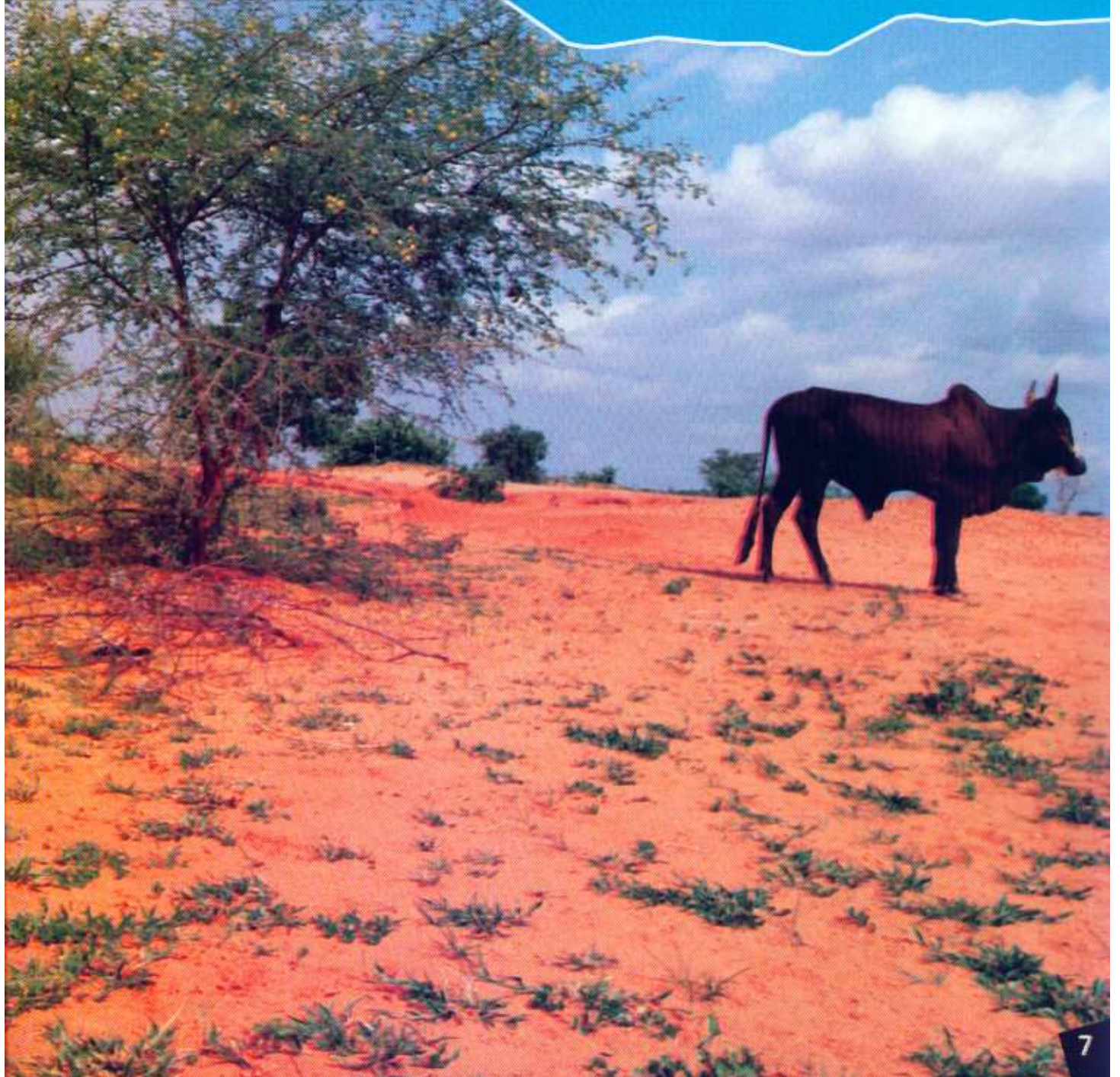






Scientists aren't the only people concerned about our climate crisis. Politicians, economists, journalists, and citizens of nearly every country are talking about global warming and looking for solutions. Will global warming change our planet forever?

That's up to us.

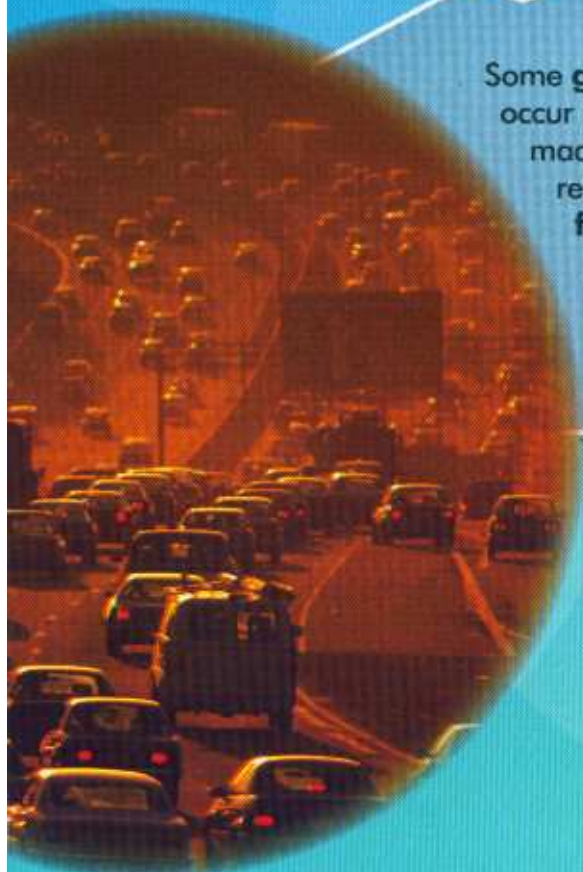




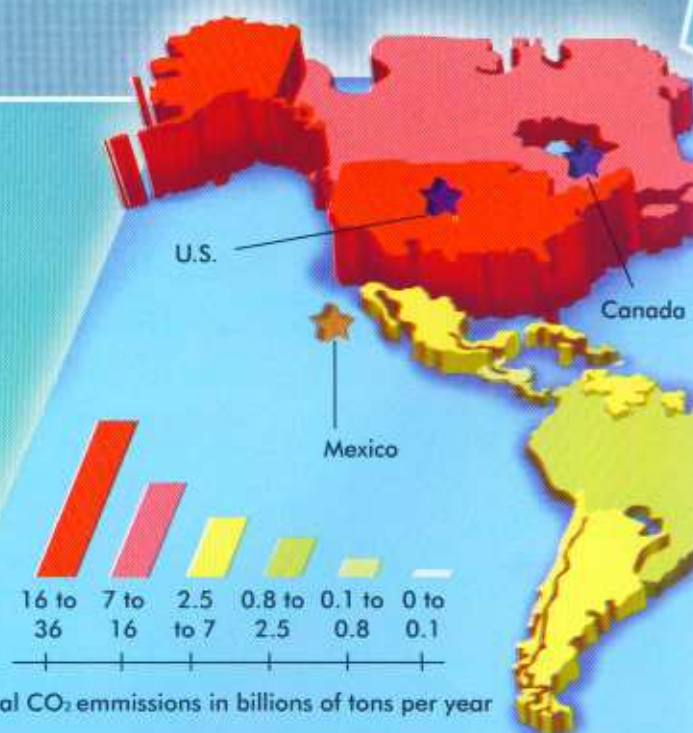
# Understanding Global Warming

Earth absorbs solar radiation from the sun. Earth's surface reflects some of that radiation into outer space. Yet some radiation is trapped by gases in our atmosphere. The gases hold that heat in. These gases act like a greenhouse.

Some **greenhouse gases**, like water vapor and **carbon dioxide**, occur naturally. Others, like **chlorofluorocarbons (CFCs)**, are made by humans. CFCs are pumped into spray cans and released when we use spray products. The burning of **fossil fuels**, such as oil, coal, and gas, can also increase the levels of greenhouse gases.



▲ Every year, automobiles release millions of tons of carbon dioxide and other pollutants into the atmosphere.





Greenhouse gases help keep Earth warm enough to be inhabitable. However, when our atmosphere has too many greenhouse gases, the radiation stays too close to the surface of our planet. This phenomenon, known as the greenhouse effect, makes temperatures rise.

The **greenhouse effect** is not entirely bad for the planet. The atmosphere is largely made of water vapor. Without water vapor, carbon dioxide, and other greenhouse gases, the average global temperature would sink to a chilly 0 degrees Fahrenheit (-18 degrees Celsius)! Earth would be entirely covered by ice.

However, temperatures across the globe have increased nearly 1 degree Fahrenheit (.6 degrees Celsius) in the last 100 years. Using computer-generated models of Earth and its atmosphere, scientists predict that the world's temperatures will continue to rise.



▲ Our planet is slowly warming because of the heat-trapping greenhouse gases in the atmosphere.

▼ This chart shows, by nation, the amount of carbon dioxide emitted each year. The United States and Australia are the two largest sources of carbon dioxide pollution.



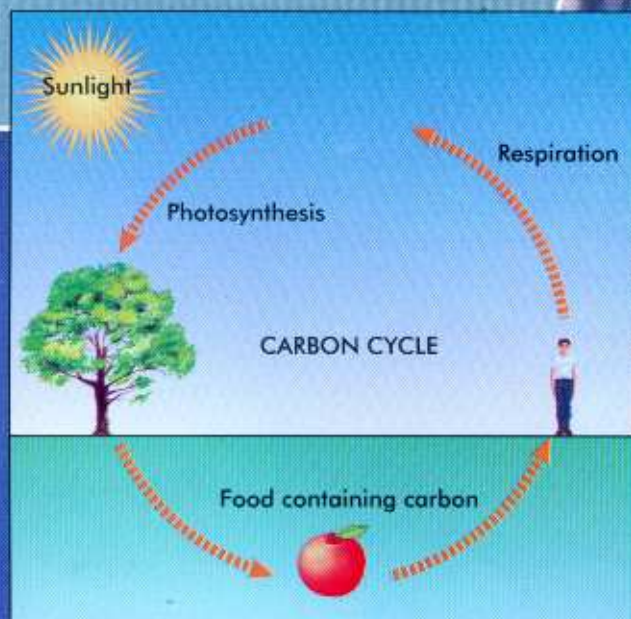


## Why is it happening?

The Earth naturally contains a lot of carbon. It is present in the atmosphere, soil, trees, water, even in all animals and human beings. Carbon is continuously exchanged between the atmosphere, vegetation, land and bodies of water.

Carbon is exchanged between plants and animals through respiration and photosynthesis, and through gas exchange between the oceans and the atmosphere.

Through this process of exchange the Earth maintains a natural carbon balance. When concentrations of carbon dioxide ( $\text{CO}_2$ ) are upset, the system gradually returns to its natural state. However, this process of readjustment is slow and takes a lot of time.



Plants absorb carbon dioxide and sunlight to make food. Human beings eat plants' fruits and breathe out carbon dioxide into the atmosphere.



Since the industrial revolution started, the quantity of carbon that is being released into the atmosphere has increased. The natural carbon removal can't keep pace, so the concentration of  $\text{CO}_2$  in the atmosphere increases. Similarly, the quantity of other greenhouse gases such as methane has also gone up, disrupting the natural cycle. As a result, there has been a continuous build-up of these greenhouse gases in the atmosphere.

▲ Everything in nature is made up of carbon. Its content is continuously changing through carbon cycle.



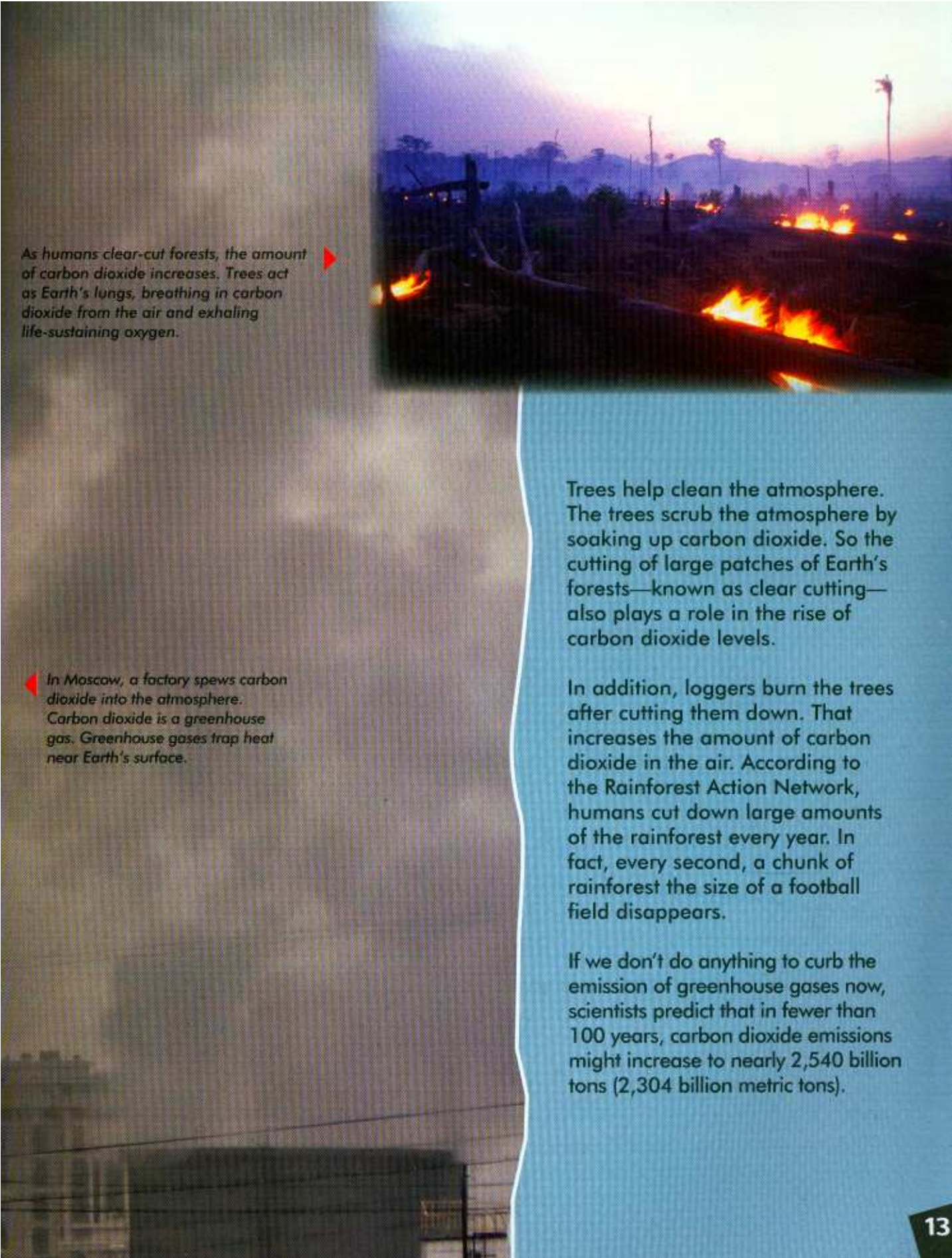
## How much is too much?

Consider some facts about greenhouse gases. Carbon dioxide is a greenhouse gas that is a natural product of animals' breathing. Yet human activities, such as driving automobiles or burning coal and wood, have contributed to a 20 to 30 percent increase in carbon dioxide since the start of the Industrial Revolution in the 1800s.

Each year, humans add about 4.4 billion tons (4 billion metric tons) of carbon dioxide into the atmosphere. Vehicle emissions and the burning of coal and other fossil fuels in factories are two reasons why there is so much carbon dioxide in the atmosphere.







As humans clear-cut forests, the amount of carbon dioxide increases. Trees act as Earth's lungs, breathing in carbon dioxide from the air and exhaling life-sustaining oxygen.

◀ In Moscow, a factory spews carbon dioxide into the atmosphere. Carbon dioxide is a greenhouse gas. Greenhouse gases trap heat near Earth's surface.

Trees help clean the atmosphere. The trees scrub the atmosphere by soaking up carbon dioxide. So the cutting of large patches of Earth's forests—known as clear cutting—also plays a role in the rise of carbon dioxide levels.

In addition, loggers burn the trees after cutting them down. That increases the amount of carbon dioxide in the air. According to the Rainforest Action Network, humans cut down large amounts of the rainforest every year. In fact, every second, a chunk of rainforest the size of a football field disappears.

If we don't do anything to curb the emission of greenhouse gases now, scientists predict that in fewer than 100 years, carbon dioxide emissions might increase to nearly 2,540 billion tons (2,304 billion metric tons).



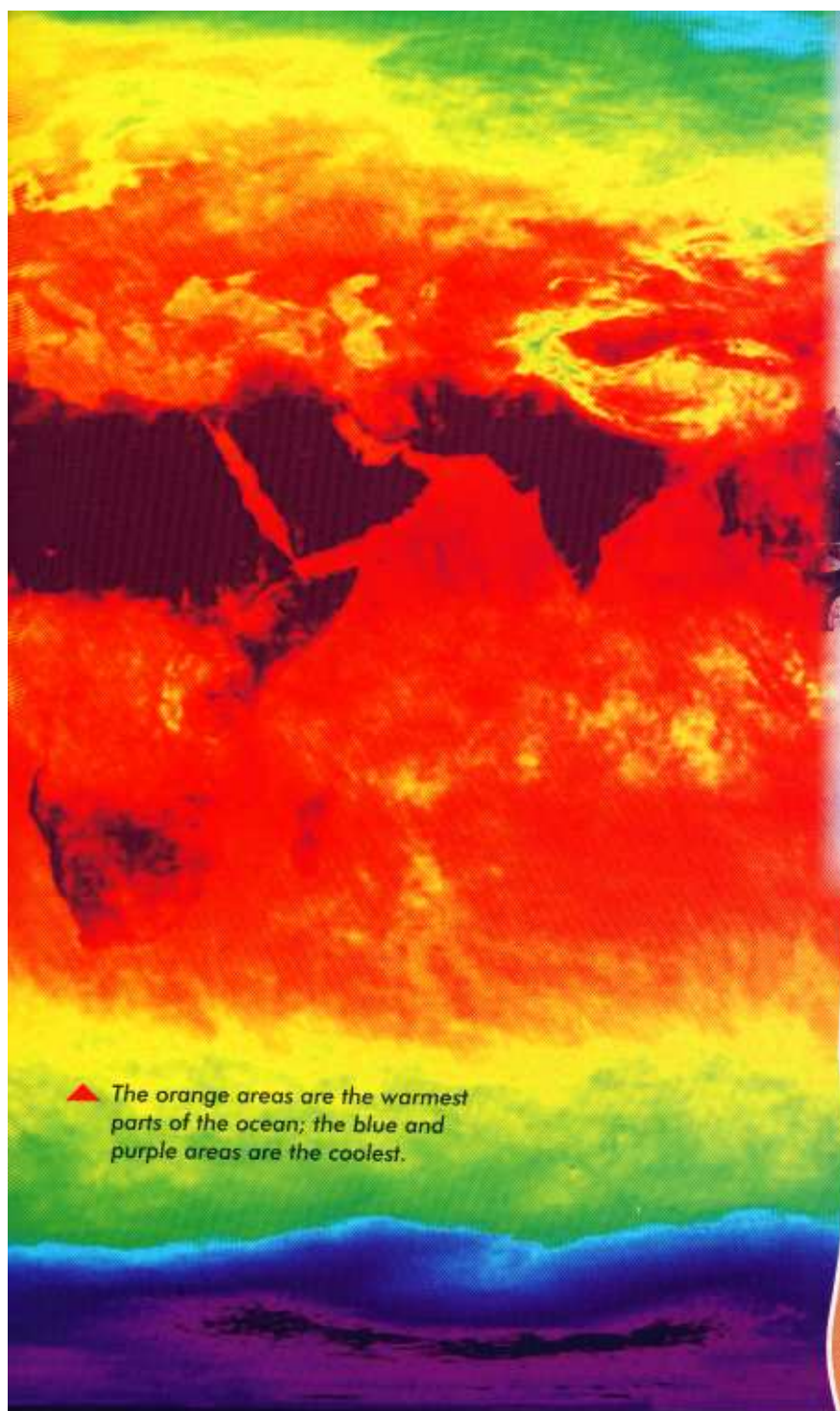
# Taking Earth's Temperature

Earth has gone through various periods of natural heating and cooling. But in the last 50 years, Earth's average yearly temperature has been steadily increasing. The levels of heat-trapping gases are also increasing, and Earth is warming at a more rapid rate than ever before.

◀ A Russian oil well spews smoke into the arctic air. The burning of fossil fuels, such as oil, contributes to global warming.

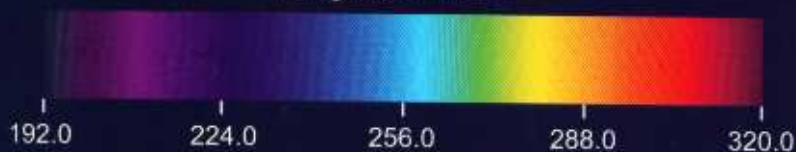
The computerized image above shows the temperature of Earth's oceans on the Kelvin scale. Scientists use the Kelvin scale when measuring temperature. It begins at absolute zero (-273.15 Celsius or -459.7 Fahrenheit). This zero point is considered the coldest known temperature in the universe. ▶





▲ The orange areas are the warmest parts of the ocean; the blue and purple areas are the coolest.

Degrees Kelvin



▲ A scientist drills through a glacier hoping to retrieve an ice sample from millions of years ago. The scientist will study the ancient sample hoping to find out what Earth's climate was like.

Glaciologists can calculate how much glaciers are melting each year by drilling into the ice and studying ice samples. These samples are millions of years old. The ice trapped air bubbles that can be used to create a record of Earth's temperature throughout history. Most of Earth's glaciers have been slowly shrinking for over 100 years, but scientists say the melt rate has accelerated dramatically since the mid-1990s. The rate of Greenland's glacier melt has doubled in the last five years.



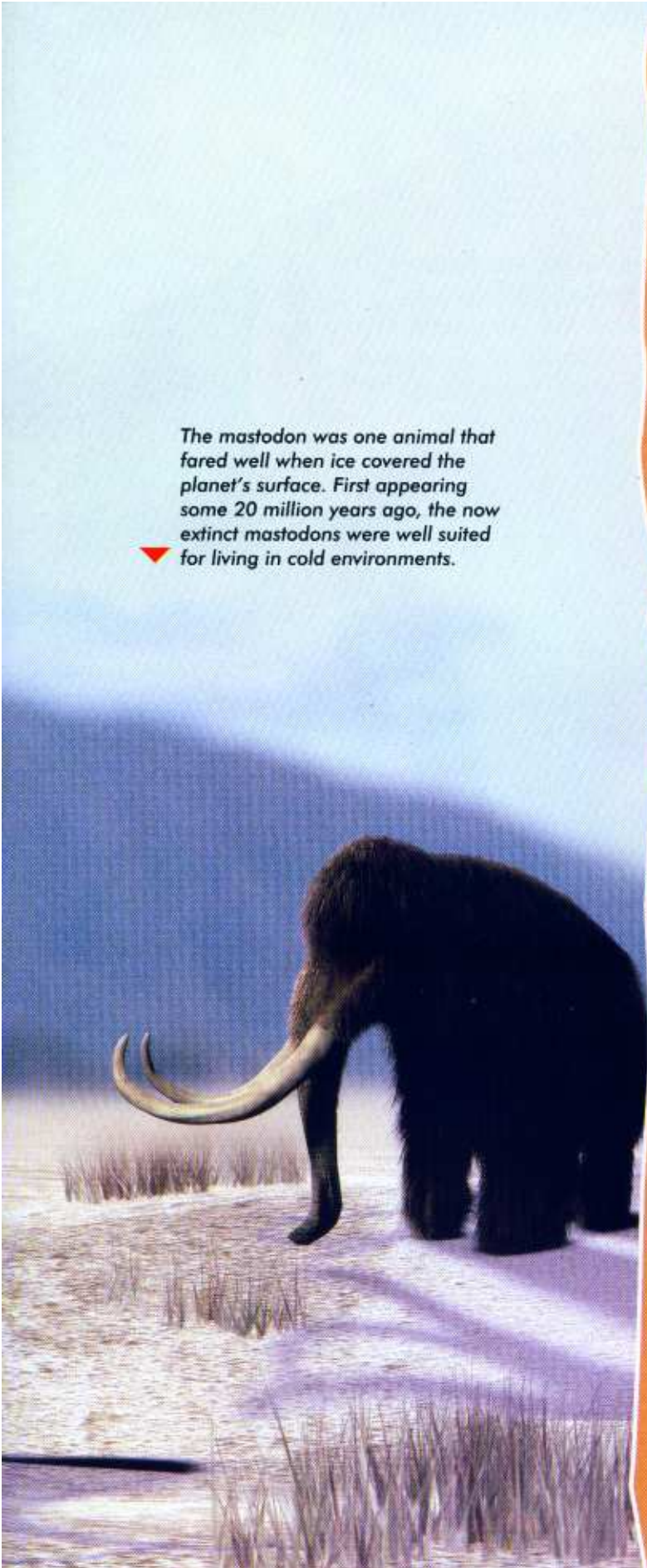
## Icy, hot

The first ice age occurred about 2.4 billion years ago. The average global temperature hit a low of -90 degrees Fahrenheit (-68 degrees Celsius). Earth was covered in a blanket of ice.

During the early part of the Cretaceous period, about 100 million years ago, the average temperature was 10 to 20 degrees higher than today's temperature. During that time, there was little difference in temperature between the equator and Earth's poles.







The mastodon was one animal that fared well when ice covered the planet's surface. First appearing some 20 million years ago, the now extinct mastodons were well suited for living in cold environments.

In fact, Earth has gone through at least five ice ages since the planet formed 4.5 billion years ago. The last ice age ended about 12,500 years ago.

Some scientists say that a rise in global temperatures should be expected as part of a natural swing. These scientists point to a time called the little ice age, which followed a period of above-average global temperatures called the medieval climate optimum. That time frame provides a historical example of rapidly changing temperatures.

Not everyone is worried about global warming. Some economists suggest that melting polar sea ice might even bring an economic boom. They think that the thawing of frozen areas will open up new regions for mining, oil drilling, and fishing.

Others, however, think that melting glaciers will cause major flooding throughout Europe and along the coasts of all the continents. Some glaciers are the source of rivers that provide drinking water to a large portion of the world's population. Without these glaciers, there could be a shortage of drinkable water.



## Raising awareness

In 1896, a Swedish scientist named Svante Arrhenius discovered that the amount of carbon dioxide in the atmosphere directly influences the temperature of Earth. He concluded that adding more carbon dioxide would cause the planet to warm. Arrhenius thought that a rise in global temperatures was a good thing; he believed it would prevent a new ice age.

*Swedish scientist Svante Arrhenius was the first to suggest that heat-absorbing gases in the atmosphere could influence ground temperature.*





Al Gore, a former vice president of the United States, warns in his book and movie *An Inconvenient Truth* that Earth is facing a climate crisis.



In 1957, two scientists, Roger Revelle and Hans Suess, of the Scripps Institution of Oceanography in San Diego, California, warned that Earth's oceans could no longer absorb the excess carbon dioxide that humans released into the air. They said that carbon dioxide was changing the makeup of the atmosphere. They also said that human emissions from the burning of fossil fuels would cause global warming over time.

More recently, former U.S. Vice President Al Gore warned against the dangers of global warming in his book and movie *An Inconvenient Truth*. In his book, Gore writes: "Global warming may not seem like one of our biggest dangers, but it is. Science has now proven beyond a doubt that the Earth's climate is changing, and changing much faster than originally feared."



# Extreme Weather

**Some scientists believe that as Earth's temperature increases, the planet will be hammered by more radical weather. They predict more droughts, more rainfall, more hurricanes, more floods, more heat waves, and more blizzards.**

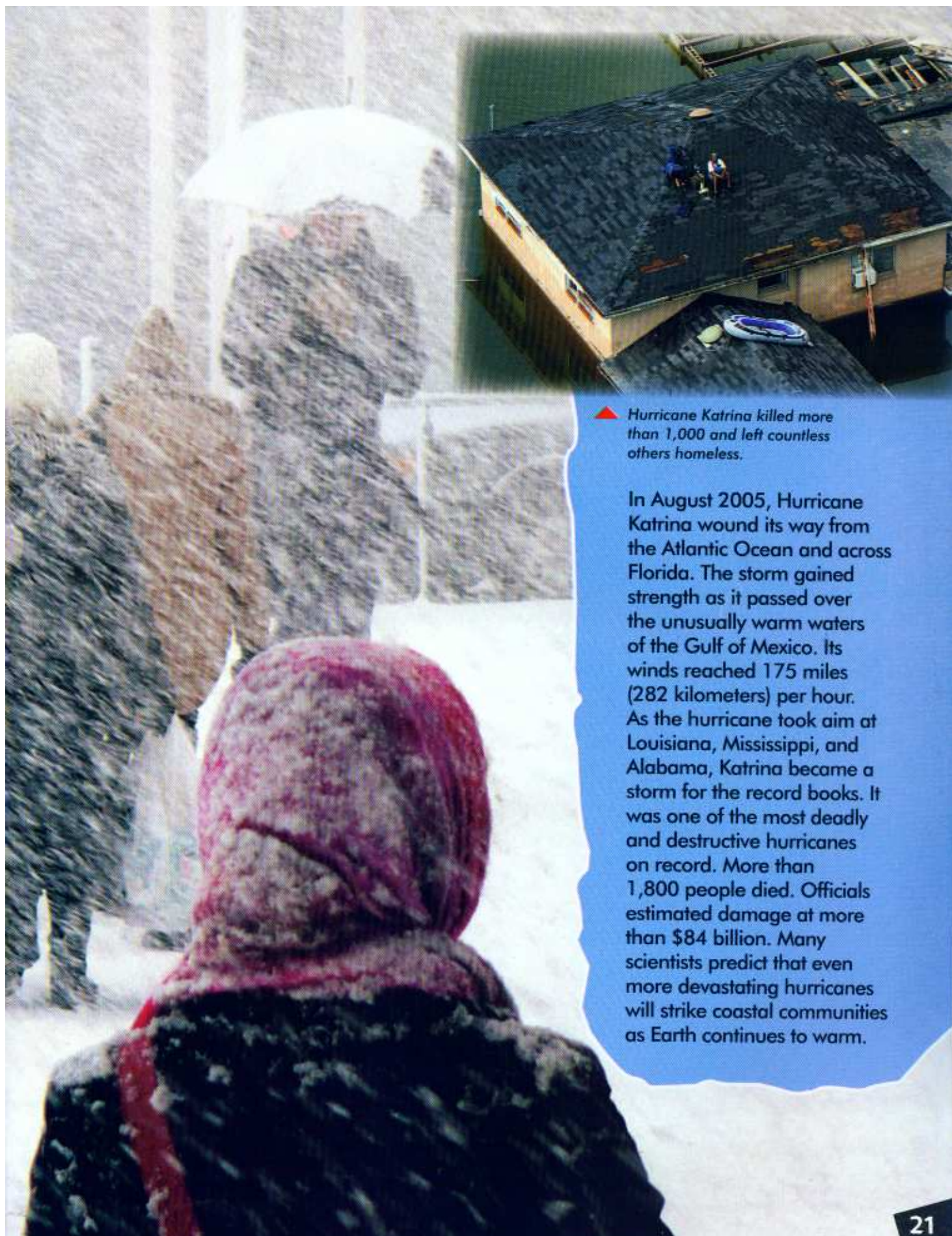
*Some scientists say that wild weather, such as blizzards, will become the norm as Earth warms and weather patterns change.*

For many people, the fiery European heat wave of 2003 was ample evidence that global warming exists. Temperatures in Paris reached 104 degrees Fahrenheit (40 Celsius). Over ten blistering days in August, 15,000 people in Paris died because of the heat. Over 30,000 died throughout Europe.

That same year, nearly 2,000 people died in India after 27 consecutive days of 120 degrees Fahrenheit (49 Celsius) heat.

*In 2003, a killer heat wave swept across Europe. Thousands sought relief during those ten miserable days. Here, in Paris, a boy plays in the Trocadero Fountain as two women sunbathe.*

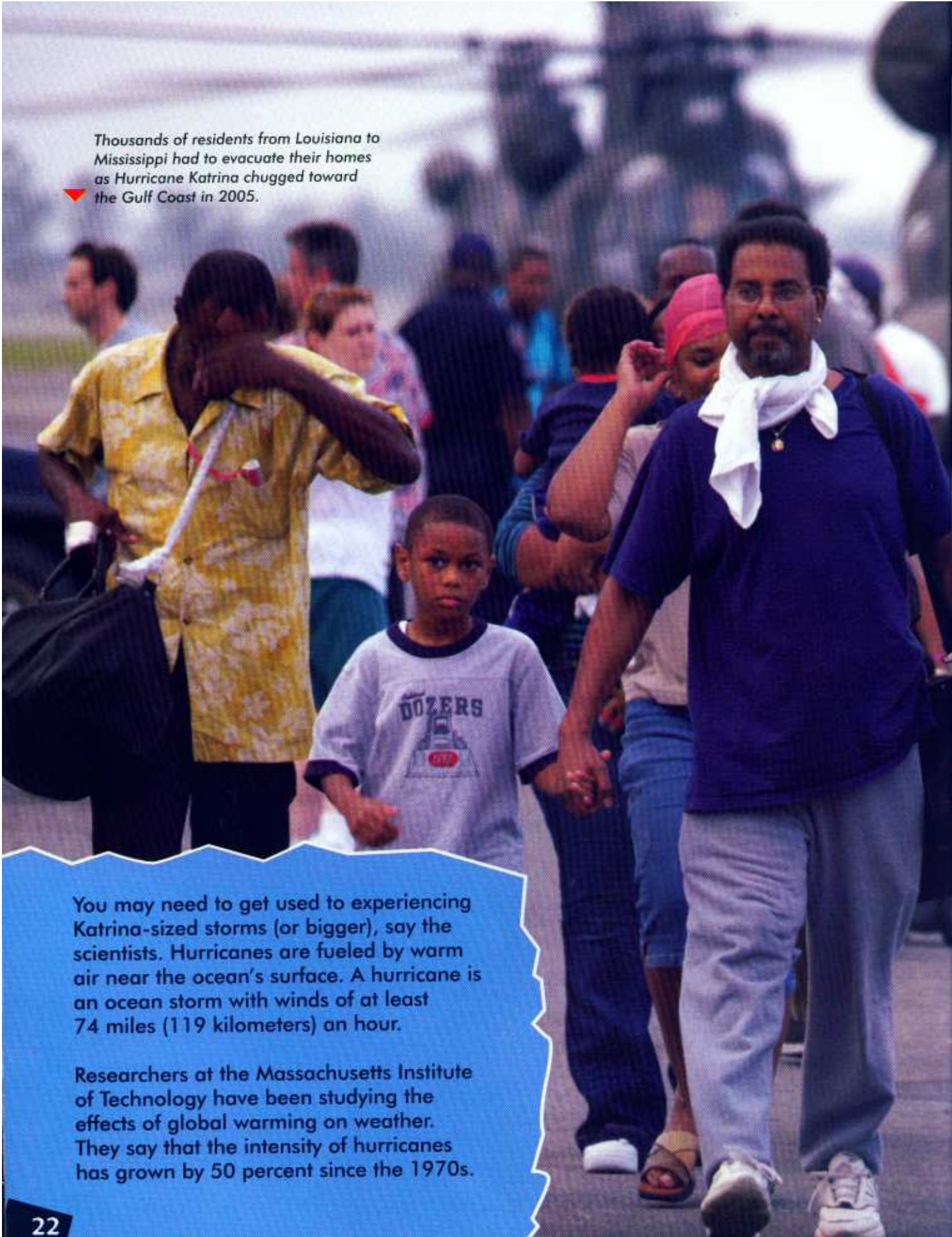




▲ Hurricane Katrina killed more than 1,000 and left countless others homeless.

In August 2005, Hurricane Katrina wound its way from the Atlantic Ocean and across Florida. The storm gained strength as it passed over the unusually warm waters of the Gulf of Mexico. Its winds reached 175 miles (282 kilometers) per hour. As the hurricane took aim at Louisiana, Mississippi, and Alabama, Katrina became a storm for the record books. It was one of the most deadly and destructive hurricanes on record. More than 1,800 people died. Officials estimated damage at more than \$84 billion. Many scientists predict that even more devastating hurricanes will strike coastal communities as Earth continues to warm.





Thousands of residents from Louisiana to Mississippi had to evacuate their homes as Hurricane Katrina chugged toward the Gulf Coast in 2005.

You may need to get used to experiencing Katrina-sized storms (or bigger), say the scientists. Hurricanes are fueled by warm air near the ocean's surface. A hurricane is an ocean storm with winds of at least 74 miles (119 kilometers) an hour.

Researchers at the Massachusetts Institute of Technology have been studying the effects of global warming on weather. They say that the intensity of hurricanes has grown by 50 percent since the 1970s.





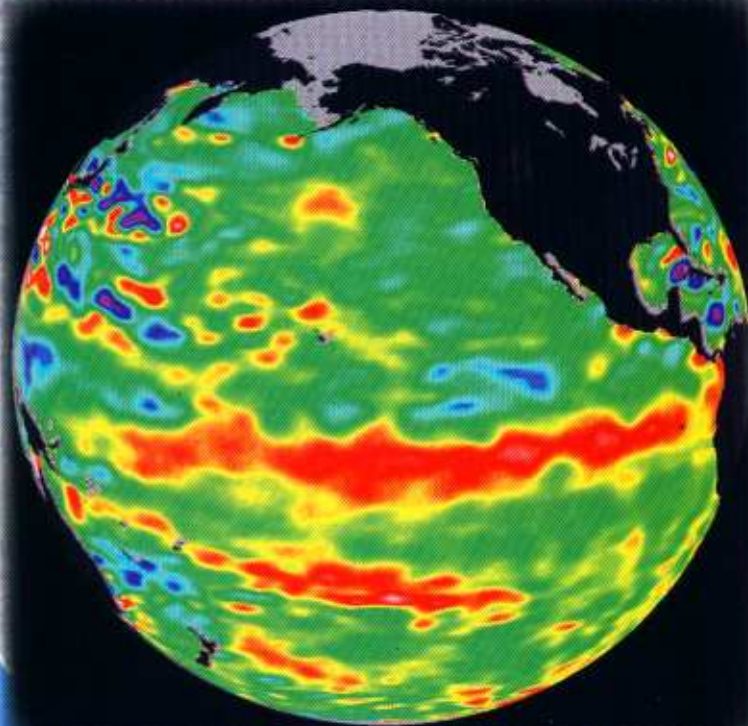
Hurricanes are now hammering parts of the world where they never struck before. In 2004, ten typhoons (hurricanes in the Pacific Ocean) struck Japan. The old record was six. That same year, a hurricane struck Brazil for the first time.

In the summer of 2007, a tornado touched down in New York City. That storm downed trees, ripped roofs off buildings, and devastated a community in Brooklyn. Tornadoes in New York City are rare. It was the sixth tornado to blow through the area since 1950, but it was the second in three years.

*Typhoons will probably grow more intense as global warming continues. In this photo, high waves strike central Japan in August 2005 after a powerful typhoon, Mawar, battered the coast.*







Because of El Niño blizzards have become more severe in many areas in recent years, causing disruptions in millions of lives.

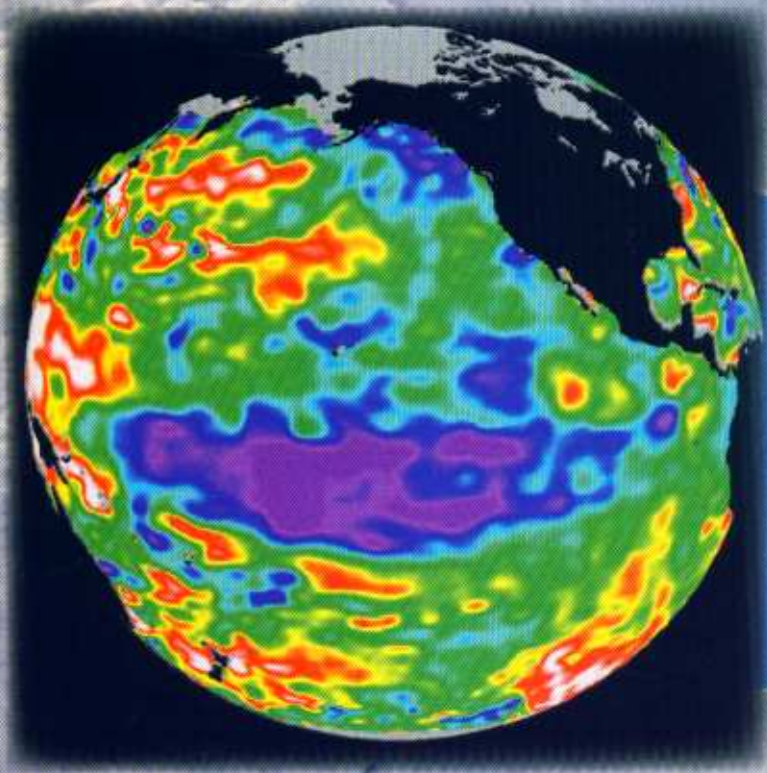
This computerized satellite image is what El Niño looks like. The red area is where the ocean is the warmest.

## El Niño, La Niña

Some researchers connect global warming and the climate phenomena known as **El Niño** and **La Niña**. El Niño is the warming of the waters in the tropical Pacific Ocean. These scientists say this warming disrupts climate patterns on land and sea.

This computerized satellite image is what La Niña looks like. The blue and purple areas are where the temperatures are the coolest.





La Niña brings cold water from the deep sea to the surface. In the 1990s, scientists blamed La Niña for inviting droughts, record snowfalls, and tornadoes to much of the United States.



### Hot time in the city

Another phenomenon linked to global warming is the urban heat island, or UHI. What is a UHI? It is like a hot spot. UHI refers to the differences in temperature between surfaces that make up the countryside, such as soil and plants, and surfaces that make up a city, such as concrete and steel.

Cities are generally warmer than the countryside. Unlike rural areas, cities have little soil and vegetation.

*These Parisians are trying to cool themselves under jets of water at Paris Plage (Paris Beach), on the banks of the Seine River. They are experiencing the urban heat island phenomenon, or UHI, which some scientists link to global warming. The UHI refers to the difference in surface temperature between cities and the surrounding countryside.*





The city is home to concrete, asphalt, steel, glass, and tar. All these materials conduct heat better than soil and plant life do.

Steel and glass buildings, asphalt streets, and concrete city sidewalks absorb most of the sun's energy. That causes heat to radiate upward. As such, the cities are hotter than the countryside.

The larger the city, the warmer the UHI. In Phoenix, Arizona, for example, the city averages 9 to 11 degrees warmer than the city's outlying areas.

Scientists expect UHI temperatures to get worse as global warming continues.



# What Will Happen?

**Will any part of Earth be spared from the impacts of global warming? From top to bottom, the planet is changing. Perhaps nowhere in the world are the effects of global warming more keenly felt than in the Arctic and Antarctica.**

◀ Antarctica was once teeming with emperor penguins. Today, the penguins are dying off because warmer sea temperatures have destroyed the birds' source of food.

## **Polar impact**

Experts say there are about 200,000 pairs of emperor penguins in Antarctica. That's half of the number counted 50 years ago. Warmer temperatures have reduced the amount of ice in the sea. That has led to a smaller population of krill. Krill are the tiny shrimplike creatures that the emperor dines on. With less food to eat, the penguins are dying rapidly.





▲ Warmer temperatures are causing massive ice sheets in Antarctica to break away.

For its part, the Arctic is heating up at almost double the rate of the rest of the planet. Scientists predict that arctic temperatures could rise dramatically, showing double-digit-degree increases by 2100.

That rise in temperature is causing the ice of the Arctic to melt. In turn, sea levels are rising. How quickly is the ice melting? About 15 to 20 percent of the sea ice around the North Pole has melted within the last 30 years.

▼ The majestic polar bear is in danger of becoming extinct. The loss of arctic sea ice has radically impacted the polar bear's habitat. There are only a handful of polar bears left in the wild.

No animal in the Arctic is suffering more from these changes than the polar bear. The loss of arctic sea ice has imperiled the polar bear, one of the world's largest predators.

Predators hunt other animals for food. While it is not a big deal for polar bears to swim 100 or more miles for food, the distance they must cover is getting greater. Even the strongest polar bears do not have the energy to swim the extra distance. They become tired and drown. There are only about 25,000 polar bears left in the wild.






## Impact on plants

Plants, along with animals, are being affected by global warming. Climate change has impacts on growing seasons and rainfall amounts. Some scientists say storms will worsen. Droughts will become more severe.

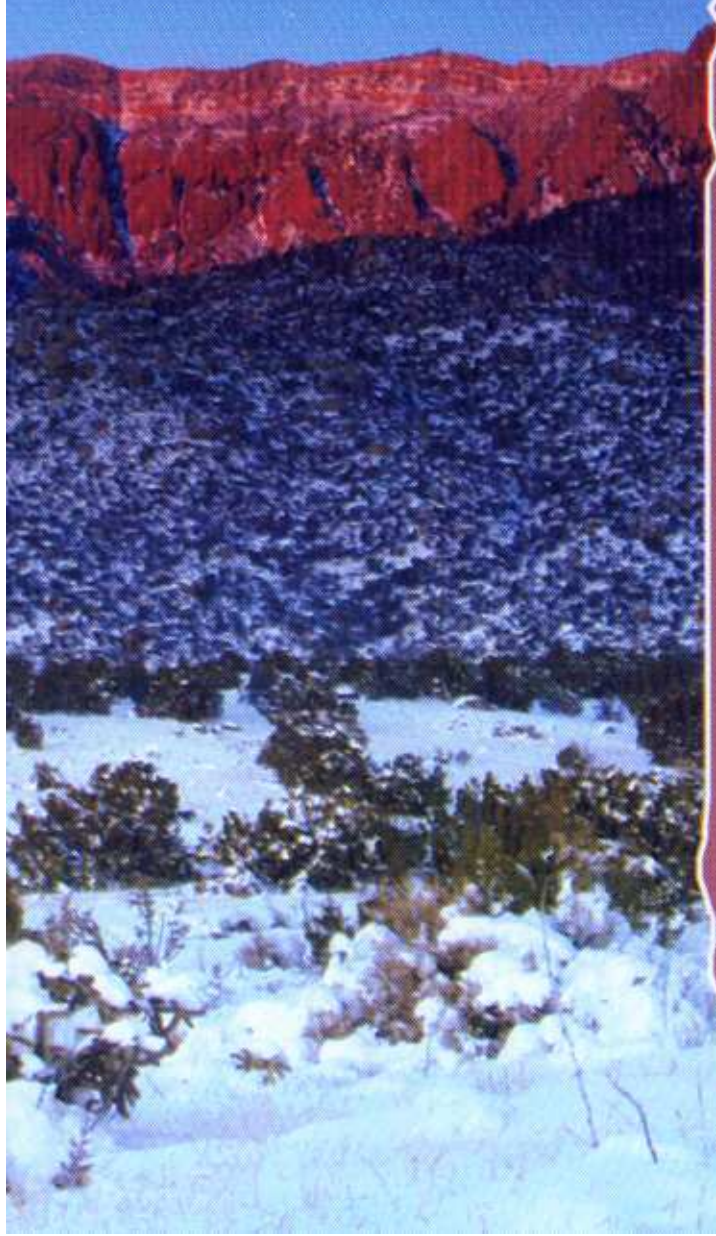
We can already see the way climate change leaves a mark on plant life. Sagebrush is replacing glacial meadows on high mountains. In the Arctic, trees are creeping northward where tundra once existed. Little grows in Somalia, Africa, where a disastrous drought has ravaged the land.

Climate change is causing sagebrush to replace glacial meadows.



A photograph showing three children in a forest, using branches to beat out a wildfire. The fire is visible in the background, and the children are silhouetted against the bright light of the flames.

Children in Ramangining, Australia, try to beat out a stubborn wildfire. Wildfires have increased in many places within the last decade.

An aerial photograph of a dry, cracked landscape. The ground is parched and fissured, with sparse, dry vegetation. In the background, there are red, rocky hills or mountains.

In the northeastern United States, you can see the effects of global warming in the decreasing amount of maple syrup being produced by farmers. Syrup makers are blaming global warming for an early sugar maple season. The farmers are not getting as much sap from maple trees as they once could. Some scientists predict that one day, the bright, crisp fall New England foliage will disappear.

In the western United States and Australia, the unwavering heat has dried vegetation, creating fuel for wildfires. Many wildfires are sparked by lightning, which increases as temperatures rise.

Between 1990 and 2000, there were almost 50 major wildfires in North and South America. Ten years before, there were only ten major wildfires on these continents. Every continent has seen a rise in the number of wildfires during the same period.



## Impact on communities

Located halfway between Hawaii and Australia, the tiny island of Tuvalu (too-VAH-loo) is as close to a tropical paradise as one can get. It has clear water, soft, warm breezes, and swaying palm trees.

The waters surrounding Tuvalu are rising so fast, however, that scientists predict that in 50 years the ocean will completely swallow the tiny 10-square-mile island. There are nearly 11,000 residents living in Tuvalu. Some have left for other countries.



▲ Tuvaluan boys play in the rising floodwaters at high tide in Funafuti, the capital of Tuvalu.

Far from Tuvalu, the residents of Shishmaref, Alaska, located on Sharichef Island, are facing the same situation. The region's sheet ice is melting. The reduction in sea ice causes wicked storm surges to reach shore, thawing the once permanently frozen ground. The residents of this tiny community have voted to evacuate to the mainland.

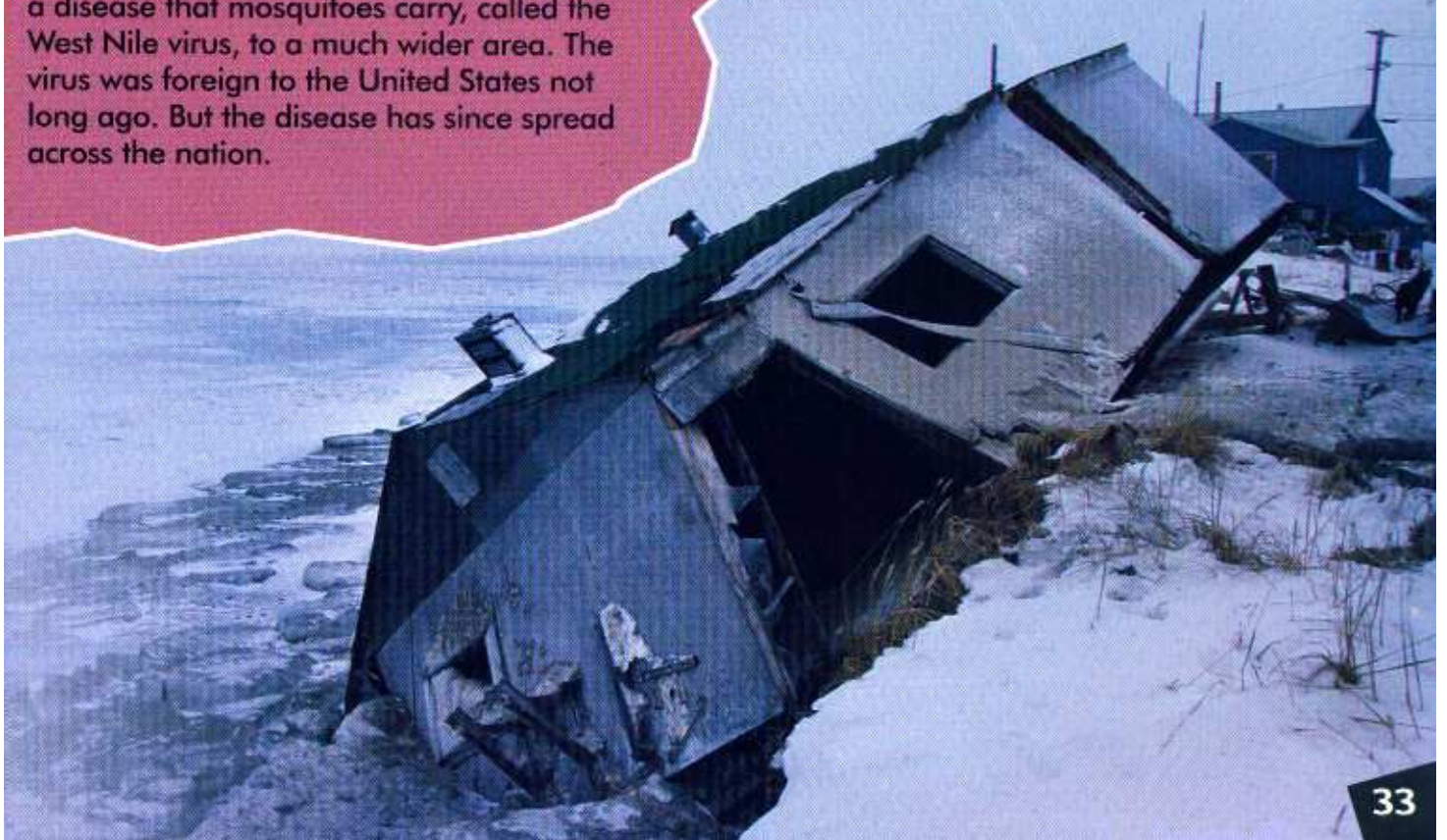
▲ A house in Shishmaref, Alaska, slides onto the beach after a storm in 2005. Shishmaref is slowly disappearing as sea levels rise.



Now, some disease and pests are showing up in places where they have never been. Scientists say disease-carrying insects are multiplying rapidly because of the warmer temperatures. The mosquito population, for example, has increased. That has brought a disease that mosquitoes carry, called the West Nile virus, to a much wider area. The virus was foreign to the United States not long ago. But the disease has since spread across the nation.



The first computer satellite image of Florida (top) shows the present sea level around the state. The computer image at the bottom illustrates the parts of Florida that will be under water if the ocean level rises 6 meters (20 feet). The computer image at the bottom illustrates the parts of Florida that will be under water if the ocean level rises 6 meters (20 feet). It currently rises at about 1 meter per century.





# What Can We Do?

**Are we fighting a losing battle against global warming? Not necessarily.**



▲ In 1997, representatives from 150 countries authored the Kyoto Protocol, which seeks to reduce greenhouse gas emissions on a global level. The treaty has to be ratified by each country. In 2004, members of Russia Federation Council (seen here) voted 139 to 1, with one abstention, to endorse the protocol.

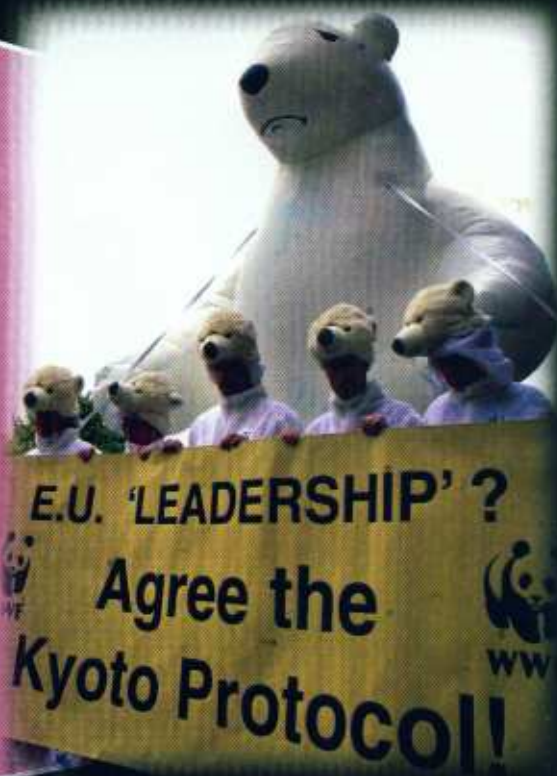
In recent years, countries have done many things to fight global warming. In 1987, a group of 172 countries agreed to stop making chlorofluorocarbons (CFCs). CFCs are human-made compounds found in aerosol spray cans. CFCs damage Earth's ozone layer. The ozone layer is part of the atmosphere that protects Earth from the sun's harmful rays.

In 1997, officials from more than 150 countries authored the Kyoto Protocol. The treaty sought to reduce greenhouse gas emissions. Many hailed the complicated treaty, named for the city in Japan where the officials met, as a good first step in fighting global warming.



However, the treaty is not legally binding until each country ratifies, or agrees to, the document. A total of 169 countries and other government organizations have signed the treaty. Yet there are some problems with the agreement. The document does not require some nations, such as China and India, to reduce their levels of greenhouse gas emissions. Environmental economists also question the effectiveness of the standards it sets. Because of this, the United States and Australia have not yet signed the treaty.

Since the United States is responsible for pumping more than 30 percent of the world's greenhouse gases, the local governments of many U.S. cities and communities have voluntarily adopted the lower emission standards and goals set by the Kyoto treaty. Other countries, such as Germany, Great Britain, and Japan, have proposed changes to their emission levels that are tougher than those that the Kyoto Protocol set. These countries have challenged the United States to meet these same goals.

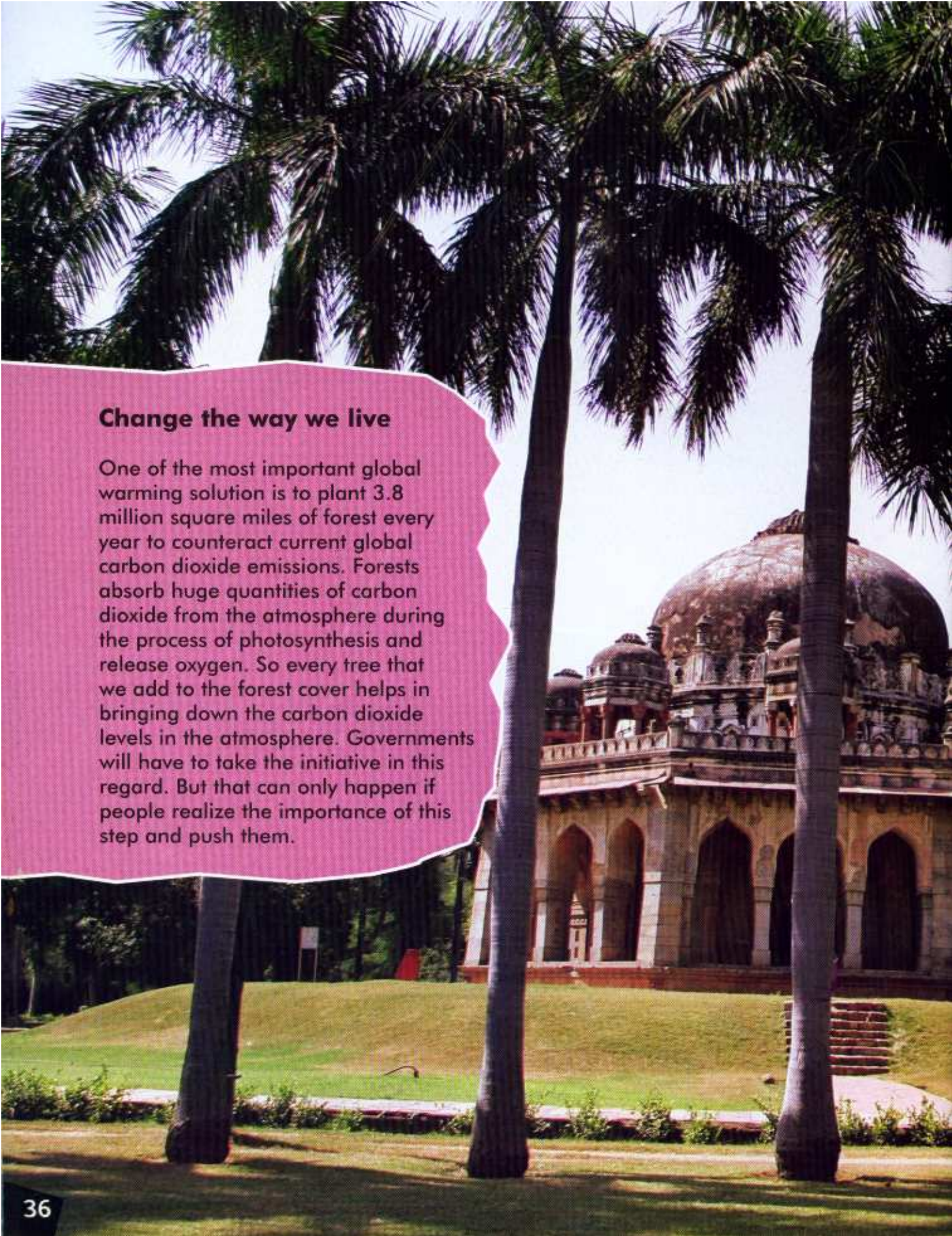


▲ Protesters dressed as polar bears in 2001, demanding that European environmental ministers approve the Kyoto Protocol.

In 1987, a group of 172 countries, including the United States, banned the use of chlorofluorocarbons (CFCs), commonly found in aerosol spray cans. CFCs damage Earth's ozone layer.








### **Change the way we live**

One of the most important global warming solution is to plant 3.8 million square miles of forest every year to counteract current global carbon dioxide emissions. Forests absorb huge quantities of carbon dioxide from the atmosphere during the process of photosynthesis and release oxygen. So every tree that we add to the forest cover helps in bringing down the carbon dioxide levels in the atmosphere. Governments will have to take the initiative in this regard. But that can only happen if people realize the importance of this step and push them.





*Parks and gardens  
in a city balances  
excessive carbon  
dioxide in the  
atmosphere.*

The cheapest and fastest way to cut global warming pollution is to make things that use electricity — like appliances, industrial equipment and buildings — more energy-efficient. Every single Individual can make big differences which will in turn have a huge impact on global climate change in a positive way. Energy Star is an international standard for energy efficient products. Products that carry the Energy Star logo use energy very efficiently. There is also the added advantage with these products that they are cheaper to run. Similarly, houses that follow "green building" construction can reduce the enormous amounts of energy that buildings consume.



▲ *Electrical appliances used at homes  
contribute to high energy consumption.*



## Alternative fuels

In 2007, more than half of U.S. electricity was produced by burning coal. Half of U.S. carbon dioxide emissions came from burning coal. To curb the effects of global warming, some companies have begun experimenting with alternative fuels. For example, some utility companies try to catch the wind to generate electricity. They have built giant wind farms.

A 100-megawatt wind farm, with about 50 windmills, can generate enough power to light 24,000 homes. A coal-fired power plant would have to burn 50,000 tons (45,360 metric tons) of coal to provide that same amount of electricity.

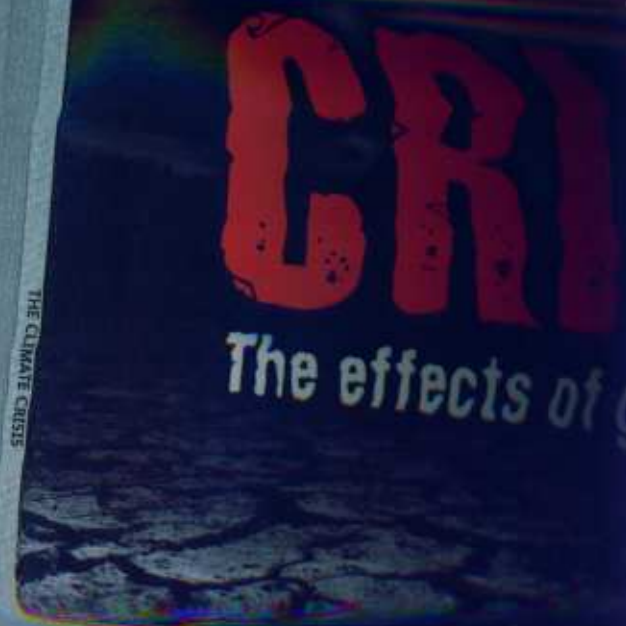
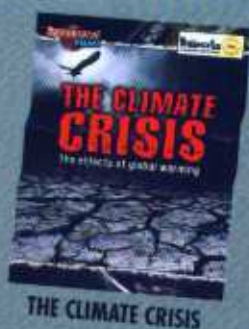
Wind power is turned into electricity by wind turbines like this one. Wind power is one alternative fuel that can help reduce greenhouse gas emissions.



Hydrogen-fueled cars might  
one day replace automobiles  
that run on gasoline.



...is getting faster by the  
minute, starting to affect  
... what we can do at  
control it. 'Climate Crisis' is an  
book full of lovely images and  
text.






# You Can Help

**You don't have to wait until you are grown up to do something about global warming. Scientists agree that the burning of fossil fuels is causing global warming. Since these fuels are burned for energy, and everyone uses energy, everyone can help stop global warming just by using less energy.**

Think about the things you do each day that use energy. The lights in your house use electricity. The TV and computer, the washing machine, all use electricity. Every time you ride in your car, it uses petrol. Turn off all the lights in a room if you are not using it. Turn off your TV, computer and video games if you are not using them.



A photograph of a bedroom corner. On the left, a bed is covered with a white sheet and has two pillows: one with a brown and red paisley pattern and another with a tan ribbed texture. On the wall above the bed is a framed picture of a person in a large, round, orange-brown garment. To the right of the bed, a lamp with a woven, conical shade sits on a dark wooden nightstand. The lamp is turned on, casting a warm glow. Next to the lamp is a green leafy plant and a small figurine of a woman in a purple dress. A wicker basket is on the floor next to the plant. In the upper right corner, there is a red triangle icon followed by text.

Remember to always turn the lights off when you leave a room.

Use products that have been made locally. Transporting goods over long distances results in pollution. Learn all about energy efficiency. Find out which products use less energy. Most electronic products come with an Energy star logo if they consume less energy. Look for this logo if you are planning to buy something.

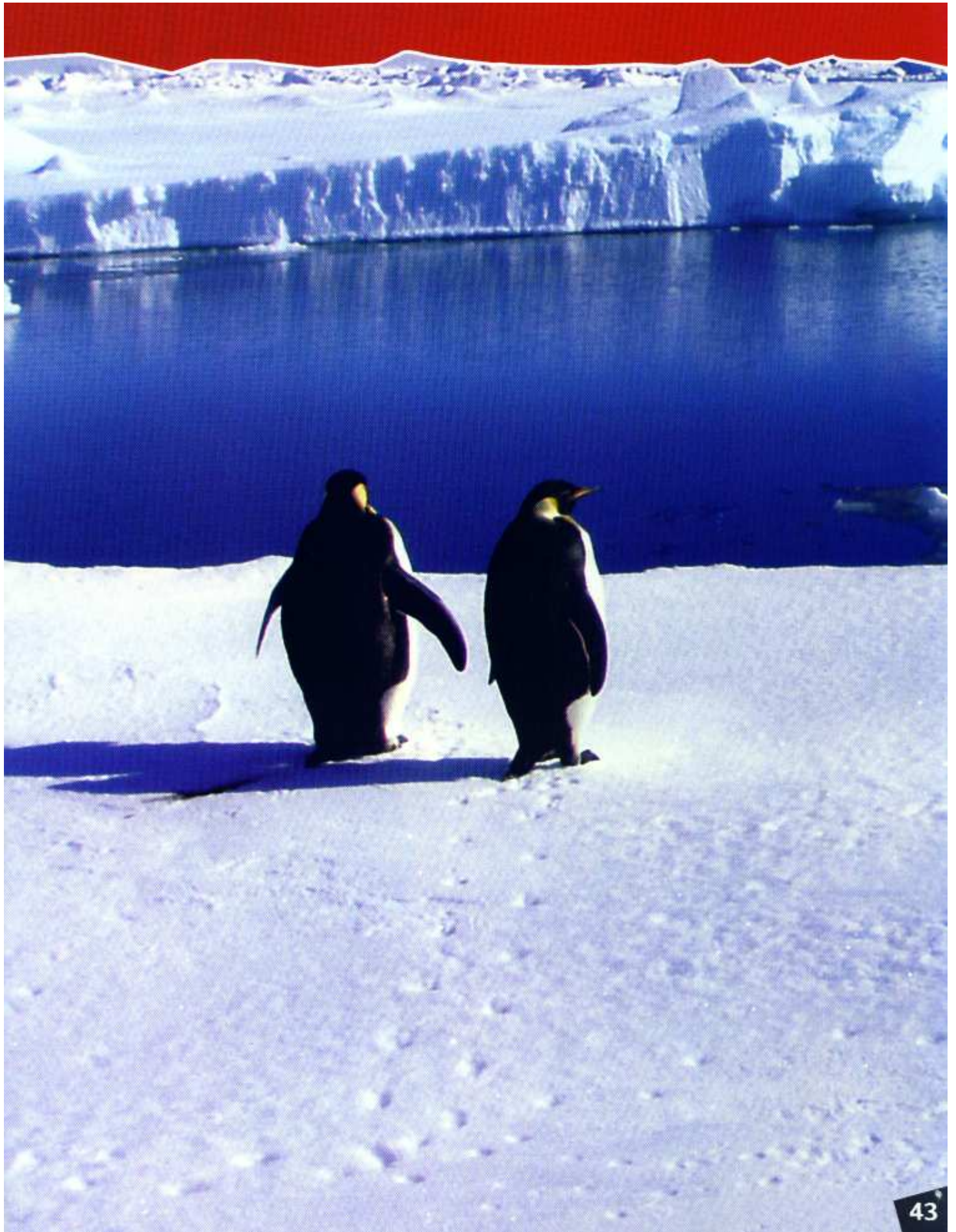


## Facts At A Glance

---

- For 10,000 years the amount of carbon in our atmosphere (280 parts per million) remained constant. Over the past century, the atmospheric concentration of carbon (now at over 360 ppm) has increased by 31 percent, due to our increased burning of fossil fuels (esp. coal and oil).
- The rate of warming is increasing. The 20th century's last two decades were the hottest in 400 years and possibly the warmest for several millennia, according to a number of climate studies.
- 400,000 Square miles of Arctic sea ice have melted in the last 30 years, threatening polar bear habitats and further accelerating global warming worldwide, according to the Arctic Climate Impact Assessment. The region may have its first completely ice-free summer by 2040 or earlier.
- Scientists state that over 1,000,000 species face extinction in the years to come. As the earth continues to change, so does the wildlife habitats and this is enough to cause extinction of millions of animals throughout the world.
- Even if we stopped emitting greenhouse gases (GHGs) today, the Earth would still warm by another degree Fahrenheit or so. But what we do from today forward makes a big difference. Depending on our choices, scientists predict that the Earth could eventually warm by as little as 2.5 degrees or as much as 10 degrees Fahrenheit.
- The sea level has risen 4-10 inches during the past 100 years.
- The biggest glacier in the Peruvian Andes was retreating by 14 feet a year 20 years ago. Today it is retreating 99 feet a year.
- Coral Reefs are home to over 25 percent of all marine life and are among the world's most fragile and endangered ecosystems. In the last few decades over 35 million acres of Coral Reefs have been obliterated and reefs off of 93 countries have been damaged, largely due to climate change.
- According to a study completed by researchers and scientists at MIT there has been a 100% increase in the intensity and duration of severe storms such as hurricanes and tornadoes since the 1970s. The study found that this is most likely due to the increase in greenhouse gas emissions which is then increasing the temperature of the earth.







## **The Young Activist**

---

- Knowledge is power. Learn all about global warming. Ask your school librarians for books on global warming and the environment. Ask your teachers if you can study the climate. Share what you have learned with your friends, parents and teachers. Tell them about what they can do to combat global warming.
- Trees help absorb the carbon dioxide from the atmosphere. Talk to your class and convince all your classmates to plant at least one sapling and take care of it so it grows into a tree. Adopt a tree in your neighborhood and take care of it.
- One of the contributors to global warming is garbage. Garbage produces methane, which is a greenhouse gas. Talk to your family and teachers. Convince them to reduce the garbage. Reuse whatever you can. Recycle cans, bottles, plastic bags, and newspapers. When you recycle, you send less trash to the landfill and you help save natural resources, like trees, oil, and elements such as aluminum.







## Glossary

**carbon dioxide**—( $\text{CO}_2$ ) one of the gases in the atmosphere; formed when a carbon-based fuel, such as coal and petroleum, is burned

**chlorofluorocarbons**—human-made chemical compounds used in aerosol spray cans, refrigeration products, and fire extinguishers

**El Niño**—a huge area of warm water that appears when winds warm in the Pacific Ocean, disrupting global weather patterns

**fossil fuels**—carbon-based fuels formed by fossilized remains of plants and animals over millions of years; coal, natural gas, and petroleum are examples of fossil fuels

**glaciers**—large masses of compacted ice and snow

**global warming**—the overall warming of Earth's surface over time

**greenhouse effect**—a warming of Earth caused when carbon dioxide and other gases trap heat from the sun in the atmosphere

**greenhouse gases**—gases such as carbon dioxide, methane, and nitrous oxide, which contribute to global warming

**hurricanes**—violent tropical storms, with winds over 74 miles (119 kilometers) per hour. Warm air over tropical water gives a hurricane its energy

**La Niña**—a huge area of cold water that appears when winds cool the Pacific Ocean, disrupting global weather patterns

**radiation**—energy from a source that travels through matter and space; solar radiation is energy from the sun

**renewable energy**—fuel sources, such as wind and solar, that exist in unlimited supply

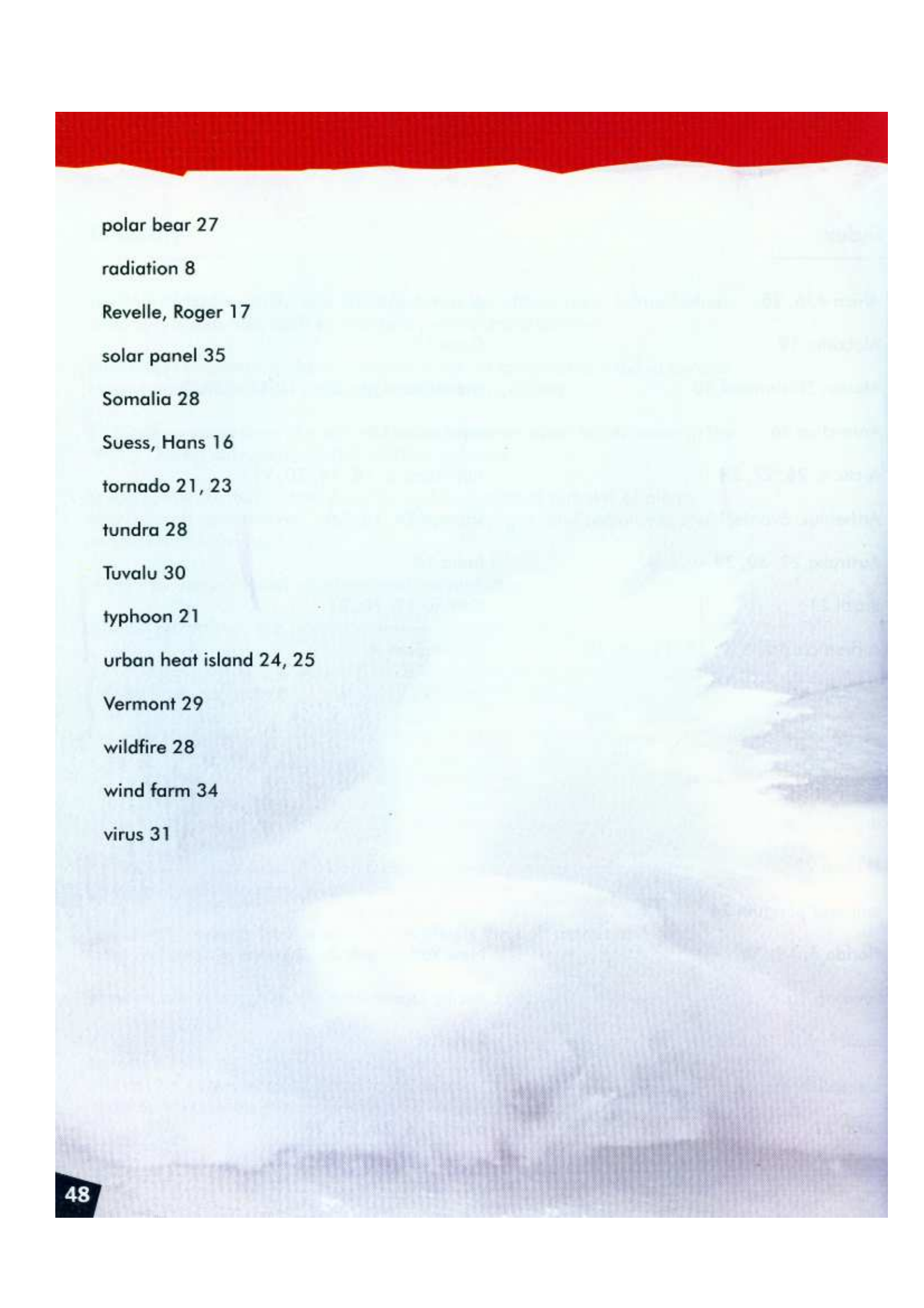
**tsunami**—a giant wave generated when some type of seismic activity, such as an earthquake, disturbs the ocean floor. The energy from such disturbances causes the movement of a large volume of water



## Index

- 
- Africa 4, 6, 28  
Alabama 19  
Alaska, Shishmaref 30  
Antarctica 26  
Arctic 4, 26, 27, 28  
Arrhenius, Svante 16  
Australia 29, 30, 33  
Brazil 21  
carbon dioxide 8, 9, 10, 11, 16, 17  
Chicago 6  
chlorofluorocarbon 8, 32  
disease 31  
drought 28  
El Niño 22  
emperor penguin 26  
Florida 6, 19, 31  
flooding 15  
fossil fuel 8, 10, 17  
fuel cell 8, 10, 17  
germ 31  
glacier 5, 13, 15  
Gore 17  
greenhouse gas 8, 9, 10, 11, 32, 33  
heat wave 18  
hurricane 6, 18, 19, 20, 21  
ice age 14, 15, 16  
India 18  
Katrina 19, 20, 21  
Kilimanjaro 4  
krill 26  
Kyoto 32, 33  
La Niña 23  
Mississippi 19  
Netherlands 31  
New England 29  
New York City 4, 21, 31  
Pacific Ocean 22  
Paris 18  
Phoenix 25  
plant 5, 6, 24, 25, 28





polar bear 27

radiation 8

Revelle, Roger 17

solar panel 35

Somalia 28

Suess, Hans 16

tornado 21, 23

tundra 28

Tuvalu 30

typhoon 21

urban heat island 24, 25

Vermont 29

wildfire 28

wind farm 34

virus 31



**Endangered  
Planet**

# THE CLIMATE CRISIS

The earth's climate is getting hotter by the day. And that is slowly starting to affect life on the planet. Read about what causes climate change, and what we can do at our end to control it. 'Climate Crisis' is an interesting book full of lovely images and informative text.

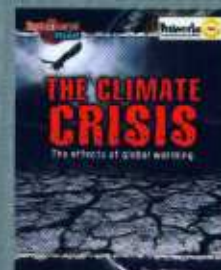
**Titles in the series**



**ANIMALS IN DANGER**



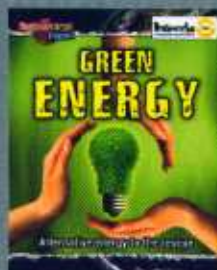
**CHOKING PLANET**



**THE CLIMATE CRISIS**



**GOING GREEN**



**GREEN ENERGY**



**SAVING OUR HABITATS**

MRP - 100/-

ISBN 978-81-7991-491-5



**Popular  
prakashan**

[www.popularprakashan.com](http://www.popularprakashan.com)